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AMERICAN AND BRITISH YACHTING.

American Yachting. By W. P. Stephens. Pp. ix+380. (London: Macmillan and Co., Ltd.) Price 8s. 6d. net.

THIS excellent book not merely contains a well written history of American yachting, but puts on record the principal points in the development of yacht designing, both in the United States and in this country, during the fifty years since the famous *America* came to this country (in 1851) and astonished English yachtsmen by her remarkable performances. The contests between English and American yacht designers have been continuous and keen, including struggles for the America Cup as well as matches of equal or possibly greater interest between yachts of many classes. Some of these have received little attention, although the results have had considerable influence on later construction. The author is a keen sportsman, fully informed upon all branches of his subject, and capable—as many other yachtsmen are in these days—of discussing the problems of yacht design on a scientific basis. Americans have inherited from this country the love of yachting as a sport, and have given repeated proofs that they are formidable rivals in the design and management of yachts. They have gradually reached an appreciation of what Mr. Stephens describes as “the importance of Yachting to a maritime nation.” He says:—

“It is a stimulus to the advancement of Naval Architecture, such as is necessary in maintaining the Naval and Merchant Fleets at the highest standard; it is a training school for seamen both amateur and professional; and its mimic battles are constant reminders of the necessity for perpetual progress in all details of Naval development.”

As to its influence on individual yachtsmen, Mr. Stephens considers that yachting

“can fairly claim a place amongst the arts and sciences as a purely intellectual pursuit. The Science of Yacht designing, a branch of Yachting which many amateurs follow as a recreation, offers an unlimited field for study and research. The man who can design his own Yacht, large or small, construct her, or at least plan and supervise the construction, and finally can guide her to the head of the fleet with his hand on the tiller, his active brain anticipating each move of clever opponents, may well lay claim to one of the highest achievements within the reach of any sportsman.”

Concurrently with the abandonment of “rule of thumb” methods in yacht design, there has been an important change in regard to the publication of information respecting the forms and equipment of yachts. Formerly, secrecy was the rule. Yacht owners took elaborate precautions to prevent the publication of details. Very often this secrecy was associated with an ignorance of principles, resulting in false estimates of the relative value and importance of causes influencing success. The late Mr. Dixon Kemp did much to break down this practice; his books on yachting remain valuable to this day. Mr. Stephens does not enter into

technicalities so fully as Mr. Dixon Kemp did, but he writes with intelligence and a grasp of principles, and his summary of events is accompanied by an analysis of distinctive features in successive designs which can be read with interest even by naval architects. He traces the influence of local conditions, and of rules of measurement for competitive sailing, upon American and British yachts. He indicates clearly how these widely differing types have, in process of time and as the result of continuous competition, gradually approximated, and led to the production of vessels on both sides of the Atlantic closely resembling one another in their main features. He gives illustrations of the general principle that as soon as a rule for time allowance is established, yacht designers begin to exercise their ingenuity so as to produce vessels which shall get the greatest possible advantage in time allowance under the particular rule in force, and he shows how, in some cases, very unsatisfactory types have been brought into existence simply for racing purposes. The story of the contests for the America Cup is told with fairness and good feeling. Like most practical yachtsmen, he does not consider that yachting has benefited on the whole thereby. He is too good a yachtsman to favour the production of mere “racing machines,” and his opinion of the latest example of American skill (the *Reliance*) is noteworthy, being summed up in the words that while she “represented a new and extreme step in the development of the racing machine, her whole form is confessedly bad for all purposes but cup-racing.” In his judgment the tendency of international racing has been to minimise the importance of model and construction, and to increase the influence of the designer, owner, and skipper. His remarks on the “challengers” in recent years run counter to the popular view. He directs attention to the fact that recent challenges have not come from yachtsmen who sail their own yachts, but from men of ample means with little or no yachting experience, who see, in the publicity attending a cup match, a means of advertising themselves.

Incidentally, Mr. Stephens brings into relief the fact that, in the United States, the design of the most successful yachts in recent years has been the work of men of considerable culture and scientific knowledge, like Burgess and the younger Herreshoff. Further, he makes perfectly clear the thoroughness of the study devoted to every problem affecting ultimate success. Not merely has close attention been given to form, stability, and sail equipment, but no expense is spared in the United States to obtain the best possible materials—thus associating strength with lightness; in modifying structural arrangements for the same purpose, or in arranging every item affecting efficiency and rapid working of sails. He frankly acknowledges that in all these matters (which greatly influence the result of yacht racing) his countrymen have obtained substantial advantages over ourselves, and equally he shows his appreciation of the favourable conditions under which they can proceed in drilling their crews and “tuning up” the vessels (to use an American expression) before the cup races take place. To one fact, however, he hardly attaches adequate importance

namely, that as British yachts have to cross the Atlantic in order to take part in the cup races, they can never be built with that extreme lightness of hull which is possible in vessels constructed on the American coast. This undoubtedly counts for much.

Mr. Stephens is an advocate of yachting as a sport, not in the sense of the races for the America or Seawanhaka Cups. He believes in the Corinthian style of yachting—owners working their own vessels. It is obvious that if he could have his way mere racing machines would disappear. Some incidents which he describes as to the performances of American yachts, and the special risks run in consequence of the production of racing machines, are very striking. Only one can be mentioned, that of the *Mohawk*, a centre-board schooner 140 feet long and more than 30 feet broad, with a depth of hold of less than $9\frac{1}{2}$ feet. This vessel drew only 6 feet when her centre-board was housed. Her sail area was enormous, and she had great initial stability; but in 1876, when at anchor off Staten Island, with all sails set and sheets made fast, she was capsized and sank, carrying with her half a dozen persons. On this side we have had equally extreme dimensions, but under our sailing rules, fortunately, there has not been the same inducement to accept serious risks; our vessels have not been lacking in stability in the sense that they were liable to be capsized.

The book may be heartily commended to all interested in yachting, either as a sport deserving continuance or as a branch of ship design.

W. H. WHITE.

A COMPREHENSIVE WORK ON PHYSICS.

Lehrbuch der Physik. By O. D. Chwolson. Translated into German by H. Pflaum. Second volume. Pp. xxii+1056. (Brunswick: Vieweg und Sohn, 1904.) Price 18 marks.

A SERIOUS problem is presenting itself to lecturers and writers of text-books on physics. Never, perhaps, has there been such rapid accumulation of knowledge, both in respect to phenomena the fundamental facts of which were found out in the early ages of physical discovery and in respect to new phenomena which reveal themselves in succession to the physical investigator. The brilliant experimental discoveries of Faraday in electrodynamics, the equally distinguished theoretical and experimental researches of Fresnel in optics, the researches of Mayer, Helmholtz, Lord Kelvin, Clausius, and Joule in thermodynamics, which are unsurpassed in importance owing to their wide reaching application to almost every branch of physics, all these make the first half of the nineteenth century unique as an age of physical discovery. This period was followed by one of comparative quiet, in which physicists began to acquire a comfortable feeling that the universe was now known; details undoubtedly there were to be made out, but no striking discovery was expected. This attitude of content was roughly disturbed by the discovery of Röntgen rays in 1895, and still more startlingly so by the discovery of various other types of rays and emanations by Becquerel and his followers. Each of these discoveries

has given birth in a most prolific way to a vast crowd of minor discoveries demanding a history of their own; and meanwhile the accumulation of fact and theory in older subjects has steadily gone on, and the problem which presents itself is, How is this huge and ever increasing amount of knowledge to be successfully presented to a student? It is becoming unmanageable. No single course of lectures can deal adequately with it. College courses are beginning to spread over two years, and even then merely skim the subject. The text-book under review illustrates the state of things. It is the second volume out of four. It extends to more than a thousand pages, and deals only with sound and with radiant energy. It contains no elaborate development of mathematical theory—in fact, the weak point of the book is that there is not enough mathematics in it. Wherever the mathematics required is other than of simple kind it is omitted; the final formula may be given, but it is often quoted unproven. How is a student to master the vast mass of material which is extended to him here? It seems inevitable that before long some process of selection must be adopted in order that a student's work may be made more easy for him. Of course, if a book is intended as a book of reference chiefly, the more encyclopædic it is the better; but the present volume is intended as a text-book, and not as an encyclopædia. We think that the ideal text-book is one which will present such a selection from ascertained knowledge as will give a student an adequate grasp of the facts, principles, and methods of his subject. The selection need not and should not be skimmed, but no attempt should be made to include *all* that is known to be true.

Regarded as a book of reference, this volume is most admirable, and we commend the enterprise which now brings it into a wider circle of readers. German is not popular amongst English students, but Russian is barred altogether. The matter is excellent and is excellently presented. It is thorough, and is brought well up to date in this edition; e.g. there is a good account of Siedentopf and Szigmondy's recent work on the vision of (so-called) ultramicroscopic particles. The chapter on interference is specially good. The illustrations throughout are unusually clear, especially those explanatory of the various instruments of observation.

The man who gets this book has only himself to blame if he learns no physics. Our only quarrel is with the size of the dose. Experience has shown us that a student fights shy of this heroic treatment, and turns for help to the text-books of the cramming institutions. Less formidable treatment might induce him to put the latter away with advantage.

OUR BOOKSHELF.

Wilhelm Ostwald. By P. Walden. Pp. vii+120. (Leipzig: Wilhelm Engelmann, 1904.) Price 4s. net.

PROF. OSTWALD has only just attained his fiftieth year, and in appearance he is full of life and vigour. He has done and is doing a great work in science; he is a man one may delight to honour, both for his intellect and for his heart. It may be merely the prejudice of the reticent Englishman, but I must confess to a feeling that these biographies of eminent men in the prime of